## The claimed invention is:

1	1.	A chemical vapor deposition process for the preparation of a single-wall
2		carbon nanotube, comprising:
3		contacting a carbon-containing gas composition with a porous
4		membrane having a first side and a second side, wherein the first side is
5		opposite to the second side, and wherein a thin catalyst layer is present
6		on at least the first side of the membrane,
7		at a temperature sufficient to decompose said carbon-containing
8		gas composition in the presence of said catalyst causing growth of a
9		single-wall carbon nanotube,
10		wherein a pressure differential exists across the porous membrane
11		the pressure on the second side being less than that on the first side.
1	2.	The process according to claim 1, wherein said growth of a single-wall
2		carbon nanotube predominantly occurs on the second side of said porous
3		membrane.
1	3.	The process according to claim 1, whorein said growth of a single well
1	٥.	The process according to claim 1, wherein said growth of a single-wall
2		carbon nanotube predominantly occurs between the catalyst and the first
3		side of the porous membrane.
1	4.	The process according to claim 1, wherein said thin catalyst layer is
2		
2		present only on the first side of said porous membrane.

## CONTINUOUS GROWTH OF SINGLE-WALL CARBON NANOTUBES USING CHEMICAL VAPOR DEPOSITION

- The process according to claim 1, wherein said carbon-containing gas
   composition comprises methane gas.
- 1 6. The process according to claim 5, wherein said carbon-containing gas composition comprises methane, hydrogen, and an inert gas.
- 1 7. The process according to claim 6, wherein said inert gas is argon gas.
- 1 8. The process according to claim 1, wherein said porous membrane has a particle size less than about 2 micron.
- 1 9. The process according to claim 8, wherein said membrane has a particle size less than about 500 nm.
- 1 10. The process according to claim 1, wherein said porous membrane is selected from the group consisting of: alumina and stainless steel.
- 1 11. The process according to claim 1, wherein said catalyst is a catalyst composition comprising iron and molybdenum.
- 1 12. The process according to claim 11, wherein said catalyst composition further comprises alumina.
- 1 13. The process according to claim 1, wherein said temperature sufficient to
  2 decompose the carbon-containing gas ranges from about 670°C to about
  3 800°C.

## CONTINUOUS GROWTH OF SINGLE-WALL CARBON NANOTUBES USING CHEMICAL VAPOR DEPOSITION

1	14.	The process according to claim 1, wherein said pressure differential
2		ranges from about 50 to about 500 Torr.
1	15.	The process according to claim 14, wherein said pressure differential
2		ranges from about 200 to about 300 Torr.
1	16.	A chemical vapor deposition process for producing a single-wall carbon
2		nanotube, comprising:
3		A chemical vapor deposition process for producing a single-wall
4		carbon nanotube, comprising:
1	17.	The process according to claim 16, wherein the ratio of Al <sub>2</sub> 0 <sub>3</sub> :Fe in said
2		catalyst composition ranges from about 50:1 to about 2:1, the ratio of
3		Al <sub>2</sub> 0 <sub>3</sub> :Mo in said catalyst composition ranges from about 100:1 to about
4		5:1, and the ratio of Fe:Mo in said catalyst composition ranges from about
5		15:1 to about 1:2.
1	18.	The process according to claim 17, wherein said catalyst has a ratio of
2		A1 <sub>2</sub> 0 <sub>3</sub> :Fe:Mo of about 9:1: 1/3.
1	19.	The process according to claim 16, wherein said inert gas is argon gas.
1	20.	The process according to claim 16, wherein the ratio of methane:
2	•	hydrogen in said carbon-containing gas composition ranges from about
3		5:1 to about 1:5 by volume, the ratio of methane:inert gas in said carbon

4		containing gas composition ranges from about 1:2 to about 1:50 by
5		volume, and the ratio of hydrogen:inert gas in said carbon-containing gas
6		composition ranges from about 1:2 to about 1:50 by volume.
1	21.	The process according to claim 20, wherein said carbon-containing gas
2		composition has a ratio of methane: hydrogen: inert gas of about 1:1:10 b
3		volume.
1	22.	An apparatus for conducting a chemical vapor deposition process,
2		comprising:
3		a first tube and a second tube, said first tube disposed at least
4		within a portion of the second tube, said first tube including a first opening
5		and a second opening, said first opening facing the interior of the second
6		tube, and said second opening being coupled to
7		a vacuum;
8		a porous membrane contiguous to the first opening; and
9		a thin catalyst layer contiguous to the at least a portion of said
10		porous membrane that faces the interior of the second tube;
1	23.	The apparatus of claim 22, wherein said porous membrane cinctures said
2		first opening.
1	24.	The apparatus of claim 22, wherein said porous membrane has a particle
2		size less than about 2 micron.

The apparatus of claim 24, wherein said membrane has a particle size

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